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SCHOOL OF LAW

Interdisciplinary Environmental Clinic

September 3, 2015

Ms. Wendy Vit
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Via email to apcpsip@dnr.mo.gov

Re: 2010 1-Hour Sulfur Dioxide Standard, Proposed Options for Area Boundary Recommendations, July 2016 Designations

Dear Ms. Vit:

On behalf of the Sierra Club, we submit the following comments on the 2010 1-Hour Sulfur Dioxide Standard, Proposed Options for Area Boundary Recommendations, July 2016 Designations.[1] We strongly urge the Department of Natural Resources ("DNR") to propose and the Air Conservation Commission to adopt and submit to the Environmental Protection Agency ("EPA") a recommended designation of nonattainment based on modeling for the Ameren Labadie Energy Center in Franklin County, Missouri.

The Labadie plant is far-and-away the largest source of SO_2 pollution in the state. It is calculated to be responsible for more premature deaths than any other coal plant in the nation without scrubbers.[2] While Ameren has installed scrubbers – which are long-proven, highly-effective SO_2 controls – on its Sioux plant, it appears to be spending considerable money on consultants and poorly-sited monitors to try to avoid installing scrubbers at Labadie.

Because three years of source-oriented monitoring data are not available for the Labadie plant, the designation must be based on modeling in order to meet the July 2016 deadline in the March 2, 2015 federal Consent Decree for the next round of sulfur dioxide ("SO_2") designations.[3] DNR's modeling demonstrates that the area surrounding the Labadie plant is not attaining the 2010 1-hour SO_2 national ambient air quality standard ("NAAQS") based on the most recent three years of the Labadie plant's actual emissions.

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[1] DNR, 2010 1-Hour Sulfur Dioxide Standard, Proposed Options for Area Boundary Recommendations, July 2016 Designations, July 24, 2015("Proposed 2016 Designation Options"), available at http://dnr.mo.gov/env/apcp/docs/2010-so2-options-for-july-2016-desig-aug-27-2015-pub-hrg.pdf.

[2] Environmental Integrity Project, *Net Loss: Comparing the Cost of Pollution vs. the Value of Electricity from 51 Coal-Fired Plants* (June 2012) at i-ii.

[3] *Sierra Club v. McCarthy*, No. 3:13-cv-3953-SI, Consent Decree filed March 2, 2015, available at http://www.epa.gov/so2designations/pdfs/201503FinalCourtOrder.pdf.

DNR's alternative option of an unclassifiable designation is not appropriate because unclassifiable only applies when there is insufficient data to support a nonattainment or attainment decision, and in this case DNR's modeling provides ample data to support a nonattainment designation. Ameren's suggestion that the area be designated attainment is directly refuted by DNR's modeling. Ameren's consultant made numerous questionable changes to DNR's modeling approach, without providing adequate justification or obtaining the necessary approval from EPA, for the apparent purpose of obtaining an attainment result. Ameren's modeling should be disregarded.

I. The Area Around The Labadie Energy Center Must Be Designated Nonattainment.

When the U.S. Environmental Protection Agency ("EPA") established the 1-hour SO_2 NAAQS in 2010, it emphasized the value of modeling in making area designations.

> [I]n areas without currently operating monitors but with sources that might have the potential to cause or contribute to violations of the NAAQS, we anticipate that the identification of NAAQS violations and compliance with the 1-hour SO2 NAAQS would primarily be done through refined, source-oriented air quality dispersion modeling analyses …
>
> Compared to other NAAQS pollutants, we would not consider ambient air quality monitoring alone to be the most appropriate means of determining whether all areas are attaining a short-term SO_2 NAAQS. Due to the generally localized impacts of SO_2, we have not historically considered monitoring alone to be an adequate, nor the most appropriate, tool to identify all maximum concentrations of SO_2.[4]

While EPA allows the use of modeling or monitoring to support a designation, a monitoring approach is only valid when it is based on three years of quality-assured data from appropriately-sited monitors.[5] Because the monitors at the Labadie plant[6] did not begin operating until April 2015, and the Consent Decree requires EPA to make an SO_2 designation for the Labadie plant by July 2, 2016, the Labadie designation must be based on modeling, not monitoring. EPA recognized this in Guidance issued shortly after the Consent Decree became final:

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[4] EPA, Primary National Ambient Air Quality Standard for Sulfur Dioxide, Final Rule, 75 Fed. Reg. 35520, 35551 (June 22, 2010).

[5] EPA, Data Requirements Rule for the 2010 1-Hour Sulfur Dioxide (SO_2) Primary National Ambient Air Quality Standard (NAAQS), Final Rule, 80 Fed. Reg. 51052 (Aug. 21, 2015); EPA, Updated Guidance for Area Designations for the 2010 Primary Sulfur Dioxide National Ambient Air Quality Standard (Mar. 20, 2015) ("Updated SO_2 Designations Guidance"), available at http://www.epa.gov/airquality/sulfurdioxide/pdfs/20150320SO2designations.pdf.

[6] The SO_2 monitors that Ameren recently constructed near the Labadie plant are not sited in areas of expected peak SO_2 concentrations and their locations were not approved by EPA. Therefore, the data they are generating should not in any event be relied upon for regulatory decisions. See comments previously submitted to DNR on behalf of the Sierra Club regarding the Ameren's "Labadie Sulfur Reduction Quality Assurance Project Plan," (Apr. 1, 2015), DNR's 2015 Monitoring Network Plan (July 20, 2015), and supplemental comments regarding the 2015 Monitoring Network Plan (Aug. 11, 2015). Copies of those letters are attached hereto as Exhibits 1, 2, and 3.

> We recognize that the timeline for designations by July 2, 2016, does not provide for establishment and use of data from new ambient monitors. Therefore, **we anticipate that in many areas the most reliable information for informing these designations will be source modeling**. The EPA has issued guidance on the use of source modeling for this purpose in the SO_2 NAAQS Designations Modeling Technical Assistance Document (Modeling TAD).[7]

Pursuant to EPA Guidance,[8] DNR performed dispersion modeling that compels a nonattainment designation. According to DNR:

> The area containing the Ameren Labadie Energy Center models violations of the 2010 1-hour SO_2 standard using actual emissions.[9]

Using 9 ppb as the regional background concentration, DNR's "maximum modeled concentration for the area was 234.5 µg/m^3 or 89 ppb, which is not in compliance with the 1-hour SO_2 standard of 75 ppb."[10] DNR also considered using the Mott Street monitor in Herculaneum for "a more conservative background concentration" of 18 ppb, which "would yield a maximum modeled concentration of 98 ppb."[11]

Sierra Club retained a modeling consultant to conduct independent modeling regarding the Labadie plant. Modeling performed by Wingra Engineering confirms that the area around the Labadie plant violates the 1-hour SO_2 NAAQS.[12]

Pursuant to section 107(d)(1) of the Clean Air Act and EPA guidance applicable specifically to the 1-hour SO_2 NAAQS, the area around the Labadie plant must be designated nonattainment.

II. The Unclassifiable Option in DNR's Proposal is Inappropriate.

The unclassifiable designation applies only "[i]n the absence of information clearly demonstrating a designation of 'attainment' or 'nonattainment.'"[13] Because DNR's modeling

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[7] Updated SO_2 Designations Guidance at 3 (emphasis supplied).
[8] Updated SO_2 Designations Guidance and EPA, SO_2 NAAQS Designations Modeling Technical Assistance Document ("Modeling TAD"), available at http://www.epa.gov/airquality/sulfurdioxide/pdfs/SO2ModelingTAD.pdf.
[9] Proposed 2016 Designation Options at 26.
[10] *Id*. at 27.
[11] *Id*.
[12] The Wingra Engineering modeling report is submitted herewith as Exhibit 4. Wingra Engineering determined that meteorological data from the Spirit of St. Louis airport was more representative of site conditions than the Jefferson City airport data used by DNR in its modeling. Although the NAAQS exceedances modeled by Wingra Engineering are almost identical to those modeled by DNR, the area boundaries based on Wingra's modeling would differ in part from those proposed by DNR. The geographic scope of the appropriate nonattainment area boundary is discussed below.
[13] Updated SO_2 Designations Guidance at 5.

demonstrated NAAQS violations near the Labadie plant compelling a nonattainment designation, the unclassifiable option in DNR's proposal is inapplicable and inappropriate.

DNR's unclassifiable option relies on (1) three months of not quality-assured data from monitors recently constructed by Ameren near the Labadie plant and (2) monitoring data from long-inactive monitors that documented high concentrations of SO_2. DNR's suggestion that the monitoring data casts doubt on the conclusions of its modeling falls far short of the mark.

First, the Labadie monitoring data cannot and do not undermine the nonattainment designation compelled by DNR's modeling. *Three months* of preliminary data from the new Labadie monitors are meaningless; *three years* of quality-assured monitoring data are required in order to determine whether an area complies with the 1-hour SO_2 NAAQS.[14] Accordingly, EPA Guidance recognizes that modeling, not monitoring, will be the principal basis for making designations for areas subject to the July 2016 deadline.[15]

In addition, the fact that Ameren's Labadie monitors have not recorded any SO_2 concentrations above the NAAQS during their first three months of operation should come as no surprise to DNR. Using the MAXDAILY output option, DNR's modeling – which documents nonattainment for a three-year period – predicts no NAAQS exceedances during the three-month time period of the Labadie monitoring data in any of the modeled years at Ameren's Northwest monitoring site, and no NAAQS exceedances in two of the three modeled years (2013 and 2014) at Ameren's Valley monitoring site.

Moreover, the data from Ameren's Labadie monitors should not be relied upon for NAAQS compliance purposes because the monitors are not sited in areas of expected peak concentrations. The modeling conducted by DNR for the Proposed 2016 Designation Options (after Ameren sited its Labadie monitors) makes clear that the Valley monitor is not sited in an area of expected peak concentrations. Furthermore, preliminary meteorological data collected by Ameren at the Valley monitoring site suggests that the meteorological data used in DNR's modeling[16] is not as representative of site conditions as meteorological data collected at the Spirit of St. Louis Airport. Modeling conducted with meteorological data from the Spirit of St. Louis Airport demonstrates that neither of Ameren's monitors is located in an area of expected peak concentrations.[17]

Second, monitoring data from the long-inactive Augusta and Augusta Quarry SO_2 monitors similarly fail to undermine the nonattainment designation required by DNR's modeling. There is no indication that either of those monitors was sited in areas of expected peak concentrations caused by the Labadie plant's emissions. To the contrary, DNR's modeling indicates that they were not sited in areas of expected peak concentrations associated with Labadie's emissions. This is shown in Figure 1, below.

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[14] The form of the 1-hour SO_2 NAAQS is the three-year average of the 99th percentile of 1-hour daily maximum concentrations.

[15] Updated SO2 Designations Guidance at 3.

[16] DNR used meteorological data collected at Jefferson City Memorial Airport in its modeling.

[17] See Exhibits 1, 2, and 3 submitted herewith.

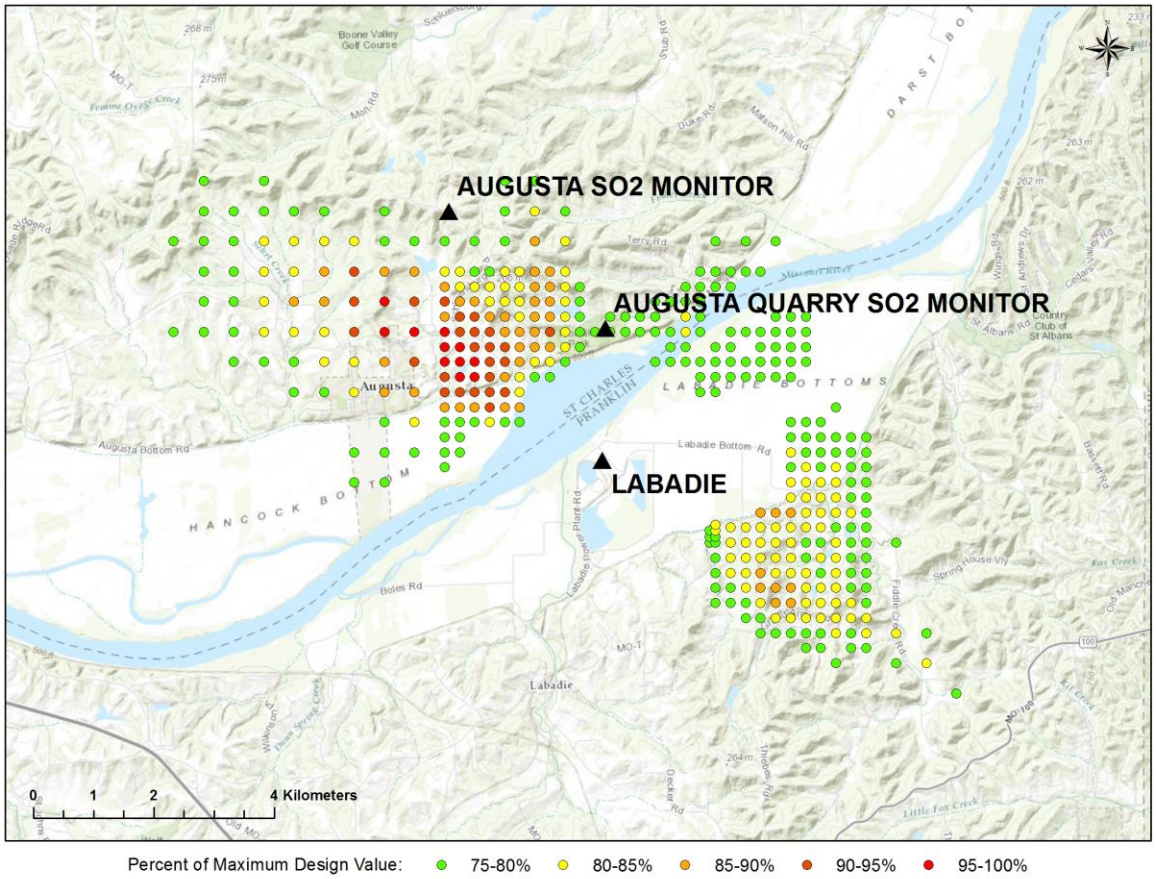

Figure 1. Augusta SO_2 monitors in relation to DNR's modeled peak concentration areas.

Furthermore, the data from the Augusta monitors reveal high 1-hour SO_2 concentrations, with consistent violations of the NAAQS. The Augusta monitor operated from July 1, 1987 until December 19, 1994. The design values for every three-year period during the monitor's operation were well above the 1-hour SO2 NAAQS – ranging from 259 ppb for 1987-1989 to 114 ppb for 1992-1994.[18] The Augusta Quarry site operated for three full years (1995-1997) and portions of two additional years (1994 and 1998). The design value for the only complete three-year period was 78 ppb, exceeding the 1-hour SO_2 NAAQS. The fourth-highest one-hour readings during two of the three complete data years were well above the 1-hour SO_2 NAAQS (86 ppb in 1995 and 80 ppb in 1997).[19]

In sum, there is no legitimate reason for an unclassifiable designation for the area around the Labadie plant.

[18] Proposed 2016 Designation Options, Appendix F, at F-3.
[19] *Id*. at F-2.

III. Ameren's Modeling Purporting To Support An Attainment Designation Actually Shows NAAQS Violations Near The Labadie Plant When Appropriate Inputs Are Used.

Ameren provided DNR with its own modeling using the latest release of AERMOD (v15181) that purports to support an attainment designation for the Labadie plant. We obtained a copy of Ameren's modeling data just before DNR's September 3 comment deadline, so our ability to comment on it in this letter is limited. Based on a cursory review and Ameren's consultant's description of it in his public hearing testimony at the August 27 Missouri Air Conservation Commission meeting, we believe that Ameren's modeling would actually show NAAQS violations near the Labadie plant if appropriate inputs were used. Therefore, it actually supports a nonattainment designation as DNR's option #1 proposes.

There are three key differences between Ameren's new modeling and DNR's. First, Ameren merged the emissions from Units 3 and 4 in a common stack, whereas DNR modeled the emissions from Units 3 and 4 separately. Second, Ameren used a pair of non-default beta options, ADJ_U* in AERMET and LowWind3 in AERMOD, which were added to the latest model release to address concerns regarding model performance under low wind speed conditions. Finally, Ameren used a background concentration based on a monitor in Nilwood, Illinois, that varies by season and hour-of-day instead of the uniform 9 ppb background concentration used by DNR, based on the monitor in East St. Louis.

As justification for merging the emissions from Units 3 and 4 in a common stack, Ameren cites EPA Model Clearinghouse Report 91-II-01. Model Clearinghouse Reports provide EPA's interpretation of modeling guidance as it applies to specific applications of air dispersion models. While often relevant to other, similar applications, Model Clearinghouse Reports do not serve as guidance of general applicability. EPA issues general guidance related to the Guideline on Air Quality Models ("Guideline") and technical aspects of dispersion models in formal "Clarification Memos." Furthermore, Model Clearinghouse Report 91-II-01 relates to the modeling of an unspecified stationary source using an unspecified model different from AERMOD.[20] Its relevance, if any, to the application of AERMOD to evaluate NAAQS compliance around the Labadie plant is speculative at best.[21] Therefore, it should not be relied upon as justification for merging the emissions from Units 3 and 4 in a common stack.

Regarding Ameren's use of non-default beta options in the latest release of AERMOD, EPA has acknowledged issues with the performance of AERMOD under low wind conditions and has proposed that these options be included as regulatory default options in a 2016 version of

[20] Development of AERMOD did not commence until 1991 and it was not adopted as EPA's preferred model for regulatory dispersion modeling until 2005. Therefore, it is inconceivable that AERMOD was used in the permit application that was the subject of Model Clearinghouse Report 91-II-01.

[21] The configuration of the stacks at the source discussed in the report was different from the configuration of the stacks at Labadie, and the report concluded that they could be merged based on an unverified assumption about the separation distance between the stacks relative to the lesser dimension of nearby structure(s), and only if the flow rates and temperatures were always the same for all three stacks. It is not known whether these conditions are met at Labadie.

AERMOD associated with a potential future final rule revising the Guideline.[22] However, they are only proposed options at this time, and EPA may or may not ultimately include either or both as regulatory defaults in the next version of AERMOD.[23] Furthermore, since they are non-default beta options in the latest release of AERMOD, their use presently requires an alternate model demonstration per Section 3.2.2 of the Guideline, which must be approved by the EPA Regional Administrator. Ameren's submission of its new modeling to DNR did not include an alternate model demonstration.

Apart from these questionable changes, the fatal flaw in Ameren's new modeling is the use of a cherry-picked "background" concentration below that used by DNR.

Ameren's background concentration is based on a monitor in Nilwood, Illinois, and varies by season and hour-of-day. This and other temporally-varying background options have been available in AERMOD since v11059. During most hours and seasons, Ameren's background concentration is significantly lower than DNR's uniform 9 ppb background concentration, which is the design value for the nearest ambient monitor (East St. Louis) based on readings for the sector with the least source influence.[24] (DNR also noted that it might be appropriate to use a more conservative background concentration of 18 ppb based on the fourth-high value of the Mott Street monitor in 2014.[25]) EPA guidance currently recommends using the overall highest hourly background SO_2 concentration from a representative monitor as a "first tier" background concentration,[26] which is a more conservative approach than DNR's. EPA's proposed revised Guideline regulations recommend using the design value as a uniform monitored background contribution across the project area, as DNR did. Ameren's use of temporally-varying background concentration does not comport with either EPA's current guidance or its proposed revised Guideline regulations.

In addition, it is noteworthy that the design value for the Nilwood monitor for the most recent three year period (2012-2014) was 9.3 ppb, slightly higher than the 9 ppb background concentration DNR used in its modeling. Previous design values for the Nilwood monitor were 8 ppb (2011-2013), 10 ppb (2010-2012), and 13 ppb (2009-2011).

The peak SO_2 concentration predicted by Ameren's new model is 73.7 ppb (approximately 193.3 ug/m^3) at a point roughly 3 kilometers northwest of the plant. This is slightly below the NAAQS, but only because Ameren used a less conservative background concentration than that used by DNR. **Using DNR's background concentration, the peak SO_2 concentration predicted by Ameren's new model exceeds the NAAQS.**

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[22] EPA published a notice of proposed rulemaking proposing enhancements to the AERMOD dispersion modeling system and revisions to the Guideline on July 29, 2015. 80 Fed. Reg. 45399, available at http://www.gpo.gov/fdsys/pkg/FR-2015-07-29/pdf/2015-18075.pdf.

[23] George Bridgers, personal communication, September 1, 2015.

[24] Proposed 2016 Designation Options, Appendix A, at A-12.

25 Proposed 2016 Designation Options at 27.

[26] EPA, Applicability of Appendix W Modeling Guidance for the 1-hour $S0_2$ National Ambient Air Quality Standard, Aug. 23, 2010, at 3.

Ameren's new modeling appears to be "results-oriented" in that its inputs were apparently tailored to yield a desired result –the appearance of no NAAQS violations near the Labadie plant – and not to accurately determine the attainment status of the area. Most egregious is the substitution of a more favorable background concentration, in a form not sanctioned by EPA guidance or regulations, instead of the background concentration used by DNR. Ameren's request for an attainment designation based on its manipulated modeling should be rejected.

IV. DNR's Proposed Nonattainment Boundaries Should Be Modified.

In addition to recommending a designation of nonattainment around the Labadie plant, DNR should modify the proposed boundaries of the nonattainment area. Per EPA guidance, the analytical starting point for determining SO_2 nonattainment areas is county boundaries.[27] Modeled NAAQS violations due to Labadie occur in both Franklin and St. Charles Counties, making these counties the starting point for the nonattainment area boundary. Partial county boundaries are appropriate in this instance, however, due to the fairly limited geographic scope of the modeled violations. For defining partial county boundaries, EPA recommends the use of well-defined jurisdictional lines such as township borders or other geopolitical boundaries, immovable landmarks, and readily identifiable physical features.[28] DNR's proposed boundary includes only portions of the two townships containing the modeled violations – Boles Township in Franklin County and Boone Township in St. Charles County – cutting off portions of both townships along transecting roadways.[29] This results in dividing up the communities of Gray Summit and Pacific in the south and New Melle in the north, creating the potentially confusing situation where some portions of each community are inside the nonattainment area and other portions are outside. To avoid this situation, we recommend modifying the proposed boundaries of the nonattainment area to include all of Boone and Boles Townships. These townships encompass just 20 percent of the total combined area of Franklin and St. Charles Counties, and therefore represent reasonable partial county boundaries for the nonattainment area.

Alternatively, DNR should consider modifying the proposed boundaries of the nonattainment area to encompass a larger portion of northeast Franklin County, which DNR's modeling suggests encompasses most if not all modeled violations when potentially more representative meteorological data from the Spirit of St. Louis Airport in Chesterfield is used.[30] With Spirit of St. Louis Airport meteorological data, the locus of modeled violations shifts to the south and southwest of the plant. A more appropriate nonattainment area boundary based on these modeled violations would encompass Boles Township, a small portion of Boone Township (south of

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[27] Updated SO_2 Designations Guidance at 5.
[28] *Id.* at 6.
[29] The northern portion of Boone Township is cut off by Missouri Route D and Highway 94; the southern portion of Boles Township is cut off by Interstate 44.
[30] Preliminary meteorological data from Ameren's Valley monitoring site suggest that the winds at Labadie may be more similar to the winds at Spirit of St. Louis Airport ("KSUS") in Chesterfield than the winds at Jefferson City Memorial Airport ("KJEF") in Jefferson City, which in turn suggests that KSUS surface meteorological data may be more representative of the area and more appropriate for modeling Labadie's emissions than KJEF data. See supplemental comments previously submitted to DNR on behalf of the Sierra Club regarding DNR's 2015 Monitoring Network Plan, attached hereto as Exhibit 3.

Missouri Highway 94), and the area west of Boles Township bounded by Missouri Route 47 and the municipal boundaries of Washington and Union, Missouri. This is shown in Figure 2, below.

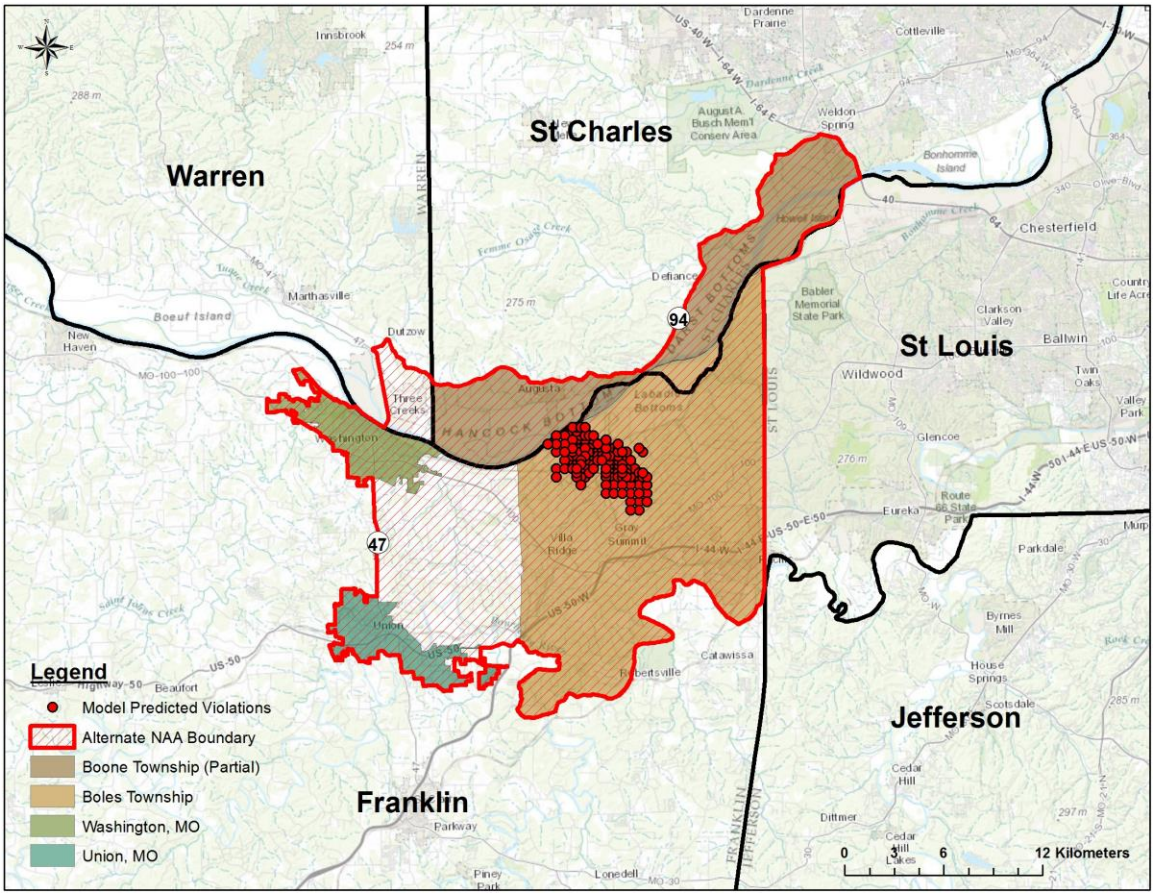

Figure 2. Alternative nonattainment area boundary based on Spirit of St. Louis Airport meteorological data.

Conclusion

We strongly urge the DNR to propose and the Air Conservation Commission to approve and submit to the EPA a recommended designation of nonattainment based on modeling for the Ameren Labadie Energy Center in Franklin County, Missouri. DNR's modeling demonstrates that the area surrounding the Labadie plant is not attaining the 2010 1-hour SO_2 national ambient air quality standard ("NAAQS") based on the most recent three years of actual emissions. This compels a nonattainment designation.

For the reasons set forth above, the unclassifiable designation option is inapplicable and inappropriate, and Ameren's suggestion for an attainment designation is fanciful.

Sincerely yours,

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